

REMARKS

Reconsideration and withdrawal of the rejections of the claimed invention is respectfully requested in view of the amendments, remarks and enclosures herewith, which place the application in condition for allowance.

I. STATUS OF CLAIMS AND FORMAL MATTERS

Claims 33-58 are now pending in this application. New claims 31 and 32 have been added to separate the herbicides previously encompassed by old claims 29 and 30. Claims 33-47 are substantially directed toward the method of use claims previously presented and claims 48-58 are substantially directed toward the composition claims previously presented. The herbicidal active agents now encompass **glufosinate, paraquat and salts thereof** and the carrier is selected from the group consisting of **aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers thereof**. No new matter has been added by this amendment.

It is submitted that the claims, herewith and as originally presented, are patentably distinct over the prior art cited in the Office Action, and that these claims were in full compliance with the requirements of 35 U.S.C. § 112. The amendments of the claims, as presented herein, are not made for purposes of patentability within the meaning of 35 U.S.C. §§§§ 101, 102, 103 or 112. Rather, these amendments and additions are made simply for clarification and to round out the scope of protection to which Applicants are entitled.

II. THE 35 U.S.C. 103(a) REJECTION HAS BEEN OVERCOME

1. Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected as allegedly being obvious over Naranayan. The applicants request reconsideration of this rejection for the following reasons.
2. Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected as allegedly being obvious over Sanders (U.S. Patent 5,635,447). The applicants request reconsideration of this rejection for the following reasons.
3. Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected as allegedly being obvious over Narayanan (U.S. Patent 5,231,070) in view of Sprinkle et al. ("Adsorption, Mobility, and Microbial Degradation of Glyphosate in the Soil", *Weed Science*, vol. 23, issue 3, pages 229-234.). The applicants request reconsideration of this rejection for the following reasons.

4. Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected as allegedly being obvious over Sanders (U.S. Patent 5,635,447) in view of Sprankle et al. ("Adsorption, Mobility, and Microbial Degradation of Glyphosate in the Soil", *Weed Science*, vol. 23, issue 3, pages 229-234.) . The applicants request reconsideration of this rejection for the following reasons.

Although the applicants do not agree with the rejections based on the use of Narayanan and Sanders references, the applicants note that the The herbicidal active agents now encompass **glufosinate, paraquat and salts thereof** and the carrier is selected from the group consisting of **aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers thereof**.

Applicants' method claims are not obvious over any of Narayanan or Sanders

Claims 14, 15, 18-23, 28, 29 and 31 were directed toward a *method* for controlling the growth of undesirable harmful plants *pre-emergently* with a *post-emergence* herbicide. As noted in the discussion above about the nature of pre-emergent and post-emergent herbicides, one of ordinary skill in the art would not have been directed to use a post-emergent herbicide in a pre-emergent manner.

In addition for the claims as amended, the composition used in the claimed method recites glufosinate and paraquat or salts thereof as the herbicide with a carrier selected from the group consisting of fuller's earth, aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers. Neither Narayanan nor Sanders teaches this particular combination of herbicides and carrier materials when considering these references as a whole.

With regard to Narayanan, the reference is quite clearly directed toward a method inhibiting leaching of active agrochemicals into the ground water and surrounding area of treatment (see e.g. the Abstract and col. 1, lines 5-10). There is no mention of the use of post-emergent agrochemicals in a pre-emergent manner nor is there any indication that this is an inherent property of Narayan's invention.

The passage in col. 2, lines 64-67 is representative of the teaching of Narayanan to only use herbicides in the manner which would be recognizable to one of ordinary skill in the art at the time the applicants' invention was made ("The above polymer/agrichemical (sic)

composition is applied to the plant or surrounding soil area in a pre-emergent or post-emergent application and in an effective leach inhibiting, plant tolerating amount.”), i.e. one of ordinary skill in the art would be directed toward the use of a pre-emergent herbicide in a pre-emergent manner or a post-emergent herbicide in a post-emergent manner NOT a *post-emergent* herbicide in a *pre-emergent* manner.

With regard to Sanders, the reference acknowledges that “[t]he present invention is premised upon the fact that...certain polymeric organic amino acids...can be used effectively in *enhancing the penetration* of herbicides such as urea herbicides *through the exterior surface cells of the weed.*” (see col. 2, lines 7-18 of Sanders). This is consistent with a *post-emergent* application, i.e. the weeds have already emerged, NOT a pre-emergent use.

The Examiner relies on a passage within Sanders to allege preemergent use, however, this fails to consider the entirety of the disclosure (“It may be used as a preemergent or postemergent application *depending on the herbicide chosen.*” – see col. 3, lines 16-18 of Sanders). As explained above, one of ordinary skill aware of the technology at the time the applicants invention was made would have used a pre-emergent herbicide for pre-emergent application.

The applicants also note that determinations of obviousness require evaluation of evidence of secondary considerations. The applicants have previously submitted evidence of unexpected results with regard to herbicidal activity which is related to the compositions of the invention (see Table A - paraquat - Example No. 46 - also presented in page 2 of the declaration filed on 17 March 2008 and Examples B.1-B.6 - glufosinate - presented in the specification)

In addition, the applicants also note that the claimed methods also include narrower embodiment for the scope of the herbicide and the carrier material and that further limitations are included with respect to dependent claims 35-41.

For any of the above reasons, the applicants’ method claims are not rendered obvious by Narayanan or Sanders.

Applicants’ composition claims are not obvious over Narayanan and Sanders

Claims 17, 24-27, 30 and 32 were directed toward compositions for controlling the growth of undesirable harmful plants *pre-emergently* with a *post-emergence* herbicide which contains a post-emergence herbicide with a carrier material selected from the group consisting of

fuller's earth, aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers thereof.

In addition for the claims as amended, the composition used in the claimed method recites glufosinate and paraquat or salts thereof as the herbicide with a carrier selected from the group consisting of fuller's earth, aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers. Neither Narayanan nor Sanders teaches this particular combination of herbicides and carrier materials when considering these references as a whole.

While the reasons for having all of the elements of the applicants' composition does not have to be the same as the reasons offered by the applicants, there still must be a showing that the combination of elements was in as complete detail as is contained in the applicants' claim. Naranayan and Sanders do not meet this requirement.

Narayanan clearly requires the presence of a crosslinked or non-crosslinked N-alkenyl lactam homopolymer in combination with an agrochemical in order to produce their leach inhibition; there is no requirement of the applicants' claimed carrier material as being a required element, i.e. one of ordinary skill in the art would not consider Narayanan as giving a detailed teaching of the combination of a post-emergent herbicide AND a carrier material of fuller's earth, aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid or copolymers thereof especially when there is no indication this would have resulted in the leach inhibition required by Narayanan and in light of the narrow scope of post-emergent herbicides now claimed.

Likewise, Sanders' combination requires that any resulting combination in an improved absorption of an herbicide into a weed and as such Sanders does not provide the applicants invention in as detailed a description as is found in the applicants' claim.

The applicants also note that determinations of obviousness require evaluation of evidence of secondary considerations. The applicants have previously submitted evidence of unexpected results with regard to herbicidal activity which is related to the compositions of the invention (see Table A - paraquat - Example No. 46 - also presented in page 2 of the declaration filed on 17 March 2008 and Examples B.1-B.6 - glufosinate - presented in the specification)

For these reasons, the applicants' compositions claims are unobvious over the Narayanan and Sanders reference.

Sprinkle reference is cited in the rejection but no explanation was given as to how this references was being relied upon

The third and fourth obviousness rejection made in the Office Action of 28 May 2008 included the Sprinkle references as a secondary reference for either Narayanan or Sanders, but no explanation was given as to how this reference was being relied upon.

No evidence which countermands assertion that pre-emergence herbicides would not be used in a pre-emergent manner for those of skill in the art

Lastly, the applicants provided in the previous response a discussion of the state of the art with regard to pre-emergence and post-emergence herbicides. However, no supporting evidence was provided by the Examiner as to why one of ordinary skill in the art would use a post-emergent herbicide in a pre-emergent manner especially when the applicants provide evidence which refuted the Examiner's unsupported position. The applicants repeat below the explanation from the previous Office Action (amended to indicate that the rejections are now based on obviousness) and if there is evidence which supports the Examiner's position or contradicts the position taken by the applicants, the applicants request that it is presented in the next communication so that this issue can be resolved on Appeal.

Introduction

In order to establish obviousness, all of the elements of the applicants' claimed invention must be taught or suggested by the cited reference or be available as general knowledge to those of skill in the art. The applicants maintain the positions previously presented in their earlier responses, but after seven (7) office actions, three (3) advisory actions and one (1) Examiner's Answer, it is apparent from the file history that either the nature of the applicants' invention has been lost or that there was never a complete understanding of the herbicidal technology in the first place. The applicants will now attempt to reset the discussion which should be help clarify the issues for Appeal should the rejection be maintained.

Pre-emergence vs. Post-emergence

The nature of the invention centers around controlling the growth of undesirable harmful plants *pre-emergently* with a *post-emergence* herbicide.

The terms “pre-emergent” and “post-emergent” are not terms which have been created by the applicants but are terms which have a distinct meaning to those of ordinary skill in the agrochemical arts. A representative meaning of these terms is provided from the website of the Biological and Agricultural Engineering department of the North Carolina State University (“Postemergence Herbicides” – <http://www.bae.ncsu.edu/programs/extension/ag-env/nursery/postemergence.html> - hereafter the “State article”).

The State article teaches that pre-emergent herbicides are applied *before* the weeds emerge and are active in the soil and prevent the weeds from emerging.

In contrast, a post-emergent herbicide will only be active *after* the weeds emerge, i.e. the mechanism for action of the post-emergent herbicide relies on the infrastructure of the weed, e.g. uptake through the roots or direct contact on the weed such as on the leaves. Obviously, one problem with post-emergent herbicides is that they would be ineffective if the weed has not yet emerged. In addition, certain post-emergent herbicides such as glyphosate and glufosinate are so potent that not only do they kill the harmful plants but also kill the plant of interest.

Furthermore, to the extent that one of ordinary skill in the art would even think to use a post-emergent herbicide in a pre-emergent manner, the state of the art actively taught against such a usage.

For example, glufosinate-ammonium (2-amino-4-(hydroxymethylphosphinyl)butanoic acid), for example, which can be used as herbicide with foliar action is known to be *decomposed rapidly in the soil, so that it is not capable of displaying any herbicidal action* (G. Hoerlein in “Reviews of Environmental Contamination and Toxicology”, vol. 138, Springer-Verlag; “The Pesticide Manual”, 11th Edition, 1997, British Crop Protection Council) and the herbicide glyphosate (N-(phosphonomethyl)glycine), which likewise has foliar action, is known to be adsorbed strongly by the soil *and to be degraded therein, so that it is not available to the plant in sufficient amounts* (L. Torstensson in “The Herbicide Glyphosate”, Butterworths, pp. 137-150). As further evidence, the applicants provide the following references in an IDS which accompanies this response:

- (1) "Detoxification of glyphosate in soil", N. T. L. Tortenson, Weed Research, 1977, vol 17, 209-212;
- *"When the chemical comes in contact with soil it is rapidly inactivated."*
[page 209 column 2]
- (2) "Rapid inactivation of glyphosate in the soil", P. Sprankle et al., Weed Science, 1975, vol 23, 224-228;
- *"In summary, glyphosate was rapidly inactivated in the soil. Corn and soybean plants grown for 16 days absorbed only very small quantities from the soil. However, glyphosate could be absorbed by plants from nutrient solution. The rapid inactivation of large quantities of glyphosate by organic and mineral soils but not washed quartz sand indicated that the herbicide was adsorbed to the soil. Glyphosate adsorption to the soil was reversible with phosphate competing with glyphosate for binding sites. The initial step in the inactivation of glyphosate applied to the soil appears to be rapid binding to the soil and not microbial or chemical degradation."*
[page 228 column left, last paragraph]
- (3) "Adsorption, Mobility, and Microbial Degradation of Glyphosate in the Soil", P. Sprankle et al., Weed Science, 1975, vol 23, 229-234;
- *"Foliar applications of glyphosate at 1.12 to 4.48 kg/ha control many perennial weeds without causing injury to crops planted a few days after application. Although the herbicide is absorbed by wheat (Triticum aestivum L. 'Avon') from nutrient solution, crop plants do not readily absorb the herbicide from mineral soils. Soil applications of glyphosate at 56.0 kg/ha did not injure wheat plants grown in muck or clay soils. Glyphosate, a substituted glycine may be bound to soil in a manner similar to glycine and/or phosphate. ..."*
[page 229 column 1]
- (4) "Metabolism and Degradation of Glyphosate in Soil and Water", M. L. Rueppel et al., J. Agric. Food Chem., vol 25 (1977), 517-526;
- *"Complete and rapid degradation of glyphosate (1) occurs in soil and/or water microbiologically and not by chemical action."*
[page 517, summary, first sentence]

- *"The parent herbicide has also been shown to be stable to sunlight, nonleachable in soil, to have a low propensity for runoff, and to have a minimal effect on microflora"*
[page 517, summary, last sentence]

Claims 21, 23, 25, 26 and 28 were rejected as as allegedly being obvious over Lovejoy (DE 2947073) and *The Agrochemicals Handbook*, 3rd Edition as applied to the rejections of Narayanan and Sanders above.

As the applicants have established that neither Narayanan and Sanders render the applicants' claimed invention obvious, the arguments presented above also apply here as obviousness requires that all claim limitation are taught or suggested.

Neither Lovejoy or the Agrochemical Handbook remedy the deficiencies of Narayanan or Sanders and are not effective references for addressing the deficiencies which were acknowledged in the Office Action, i.e. failure to teach silicon dioxide and the use of glufosinate and/or paraquat.

When making a determination of obviousness, both the applicants' claimed invention and the cited references must be considered as a whole.

Lovejoy¹ is clearly not directed to the specific teaching proffered in the Office Action as being directed to the use of silicon dioxide, i.e. Lovejoy is directed to the stabilization of an herbicide in finely divided form (i.e. solid) by using a dinitroaniline compound and a silica derivative. There was no reasonable expectation of success that an isolated element from Lovejoy could be extracted from the reference and inserted into the composition of Narayanan or Sanders which are directed to different inventions (solid vs. liquid compositions) with different purposes (stabilization vs. inhibiting leaching of agrochemicals into ground water or enhancement of herbicide absorption).

Likewise, the Agrochemical Handbook is merely a compendium of agrochemicals and when considered as a whole, there is no reason why one of ordinary skill in the art would have been directed to the teaching of glufosinate and/or paraquat (i.e. why not one of the thousands of other agrochemicals which are listed in the handbook?)

Furthermore, determinations of obviousness also require consideration of secondary considerations. As noted above, the state of the art was such that one of ordinary skill in the art would not have expected a post-emergent herbicide to be effective in a pre-emergent capacity. As such, the data provided in the specification (see pages 15-18) and by Dr. Udo Bickers in the declaration filed is surprising that ANY pre-emergent activity was observed, i.e. one of ordinary skill in the art would have expected to see no pre-emergent activity as was disclosed by Dr. Bickers in Table A, B and C of his declaration for compositions outside the scope of the claimed invention.

The results in the specification and declaration are even more surprising in that not only was pre-emergent activity observed, but little to no damage was observed for useful plants (see e.g. Table 5 from the specification where there was no effect on HORVS (barley)).

III. THE OBVIOUSNESS-TYPE DOUBLE PATENTING REJECTIONS HAVE BEEN OVERCOME

Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected for obviousness-type double patenting over Bickers et al. (U.S. Patent 6,770,594 - filing date 23 July 2001 - "Bickers").

Claims 14, 15, 17-20, 22, 24, 27 and 29-32 were rejected for obviousness-type double patenting over Schnabel et al. (U.S. Patent 6,693,063 - filing date 18 December 2001 - "Schnabel").

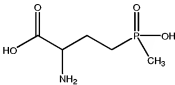
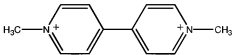
Rejections based on obviousness-type double patenting have certain similarities with obviousness rejections, however, the former is limited to a comparison of the respective claims. For the presently amended claims, neither Bickers or Schnabel would suggest the applicants' claimed invention when merely presented with the respective claims.

Bickers generically refers to herbicidal active substances in combination with a surfactant other than a silicone surfactant and one or more humectants selected from the group consisting of lactic acid and lactic acid derivatives.

Schnabel refers 1,3-halo-2-alkoxy-5-cyano-phenyl compounds as the herbicidal active in combination with one or more surfactants comprising as a structural element at least 12 alkylene oxide units.

¹ GB 2037585 appears to be an English language equivalent of DE 2947073.

In contrast, the applicants' claims are directed toward glufosinate or paraquat of salts thereof:

Glufosinate	Paraquat
	

Neither Bickers nor Schnabel's claims would direct one of ordinary skill in the art to these specific herbicides. Likewise, neither Bickers nor Schnabel's claims would direct one of ordinary skill in the art to combining glufosinate and paraquat or salts thereof with a carrier selected from the group consisting of fuller's earth, aerogels, high-molecular-weight polyglycols and polymers based on acrylic acid, methacrylic acid and copolymers thereof nor do the references suggest using a post-emergent herbicide in a pre-emergent manner.

CONCLUSION

In view of the remarks and amendments herewith, the application is believed to be in condition for allowance. Favorable reconsideration of the application and prompt issuance of a Notice of Allowance are earnestly solicited. The undersigned looks forward to hearing favorably from the Examiner at an early date, and, the Examiner is invited to telephonically contact the undersigned to advance prosecution.

Respectfully submitted,
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